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ABSTRACT

Reports on a third account of a longitudinal investigation of the effects of the installation of a curriculum engineering system in a suburban Illinois elementary school district. A system of curriculum engineering is explained as involving the organization of all personnel in the school district in the performance of the two primary functions of curriculum planning and curriculum implementation. Independent variables for data analysis consisted of the organized procedures for curriculum planning and implementation functions, the specific actions taken by teacher personnel in execution of the procedures, and leadership actions. The specific objectives of the investigation were to observe the effects of treatments on (1) general teacher attitudes, (2) attitudes of teachers toward participation in a curriculum system, and (3) actual behaviors of teachers as participants in curriculum functions. Analysis of three years' data is discussed in light of the longitudinal design of the study. (Author)

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LONGITUDINAL STUDY IN CURRICULUM ENGINEERING

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I. PROBLEM

This report is the third of a series of reports on studies designed to analyze the effects of the installation of a curriculum system in a school district with particular emphasis upon the attitudes and self-perceptions of teachers and their leaders in that district. A system of curriculum engineering involves the organization of all personnel in the school district to perform two primary curriculum functions. The two primary functions are curriculum planning and curriculum implementation. A third function, that of curriculum evaluation, is woven in the planning and implementing functions. Replanning is considered a continuous aspect of the planning function. Possible dependent variables are of two categories. One consists of measures of teachers' general attitudes, their attitudes toward participating in the curriculum system, and their perceptions of themselves as participants in the curriculum system. The second category consists of measures of teacher behaviors as participants in curriculum functions as seen by their principals. Thus far the independent variables for data analysis have been teacher personal characteristics, leadership, and system procedures and processes. The purpose of the series of studies is to observe the effects of the organizational conditions and

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events upon the attitudes and behaviors of teachers.

Definition of Terms

Certain key terms must be defined for clarity and communication. In this study a curriculum refers to a written document that is a product of curriculum planning. It is intended to be used by teachers as a point of departure for developing their teaching strategies for specific groups of pupils. The present curriculum of the district is subject centered by grade in design.

A curriculum system is a system for decision making and action with respect to curriculum functions which are regarded as a part of the total operations of schooling. The system has three primary functions: (1) to produce a curriculum, (2) to implement the curriculum, and (3) to appraise the effectiveness of the curriculum and the curriculum system.

Curriculum engineering consists of the organization and processes to make the curriculum system functional in school.

Curriculum planning refers to all activities and processes utilized in the production of a new curriculum or change to an extant curriculum.

Curriculum implementation refers to the processes utilized to get teachers to use the curriculum as a point of departure for developing their teaching strategies for their unique groups of students.

Background Information

It is sufficient for this report to indicate that a curriculum system was installed in School District 130, Cook County, Blue Island, Illinois at

the beginning of the 1970-71 school year, and the system has continued to be operative since that time. Major evaluation data gathering efforts were made in the spring of 1970, in the spring of 1972, and again in the spring of 1973. In between, descriptive information has been accumulated to show some of the efforts made to make the system work effectively.

The Blue Island school district is an elementary district in which there are approximately four thousand pupils enrolled, and they are housed in ten school buildings. One of the buildings is a junior high school encompassing grades seven and eight, one is an intermediate school, three are primary units containing kindergarten through grade three, and five are K-6 units. There are seven school principals, two of them have more than one building under their jurisdiction. In the central office, there are a superintendent, an assistant superintendent, a curriculum director, a business manager, and approximately thirty specialist supervisors. There are 124 teachers distributed among the ten schools. All professional personnel are involved in the curriculum system.

The curriculum system was designed with two purposes in mind. One was to insure that the curriculum would be adequately implemented in all schools and classrooms in the school district, and the other was to bring the district's curriculum under constant surveillance with the end in view of revising it annually wherever it is deemed important to do so. Thus, the curriculum system consists of two major functions: planning and implementing. Appraisal is a constant process during the planning and implementing operations.

All teachers are involved in the functions of curriculum planning and

curriculum implementation, but the organization structures for the two functions differ. The function of curriculum implementation takes place in the individual schools under the leadership of the building principals. Teachers develop their teaching strategies using the curriculum as a point of departure. It is the job of the principal to facilitate and improve this process. He, in turn, is accountable to the central office for the effectiveness of the implementation function in his building. For the planning function, teachers are organized into three groups: (1) a curriculum council, (2) nine committees organized horizontally by grade level, and (3) seven committees organized vertically by subject with all grade levels represented. The horizontal committees have the responsibility for reviewing any proposals for curriculum change in terms of the proposed effect upon the total plan for a single grade, particularly the horizontal articulation among the various school subjects. The vertical committees have responsibility for reviewing any proposals for curriculum change in terms of the effect of the proposed change upon the vertical, or sequential, articulation of the subject matter in question. The curriculum council acts as the final reviewer of all changes made by the vertical and horizontal committees prior to actual change in the curriculum.

II. DESIGN AND PROCEDURES

During the school year 1972-73, three types of data were collected: measures of teacher predispositions, measures of principals' ratings of teachers, and personal data about teachers. The predispositional measures for teachers were of three types: (1) general attitudes of teachers toward

teaching as measured by the Teacher Opinion Inventory (BTOI), (Bowers, 1955), (2) teacher attitudes toward the curriculum and the curriculum system as measured by the Curriculum Attitude Inventory (CAI) (Langenbach, 1969), and (3) teachers' perceptions of themselves as participants in the curriculum system as measured by the Teachers Self-Analysis Inventory (TSAI) (Beauchamp, 1970). Three types of measure of principals' ratings of teachers were collected by using: a simple sheet for principals to use in ranking their teachers on curriculum behaviors (PRK), a rating sheet for recording principals' judgments about specific behaviors of teachers with respect to curriculum implementation (PTIS), and a simple rating sheet used by principals to make judgments about their visits to teacher classrooms (CVS). Personal data about teachers were recorded with respect to school assignment, sex, marital status, grade level assignment, teaching experience, and professional preparation.

The assumed null hypothesis with respect to the data from the six measures was multi-dimensional. H_0: there are no differences in teachers' scores on the CAI, the TSAI, the BTOI, the PRK, the PTIS, or the CVS for the factors of school assignment, sex, marital status, grade level assignment, teaching experience, or professional preparation. To test the general hypothesis, the data for each of the six criterion measures and the foregoing factors were submitted to analysis of variance treatments.

Correlation analysis was performed using data from the six criterion measures in order to observe the strength of association among the measures, to determine the degree of covariance among the variables, and to establish

the independence of the measures. Regression analysis was performed to study the degree of relationships while taking into account the degree of interrelationship among the criterion measures.

An assumption behind the installation of the curriculum system in the school district was that attitudes and self-perceptions of teachers would change in a positive direction through time. To test this hypothesis, growth in mean scores between the years 1970 and 1972, 1972 and 1973, and 1970 and 1973 were observed on the CAI, the BTOI, and the TSAI. To examine the significance of the gain scores, t-tests for correlated measures were used.

III. RESULTS AND DISCUSSION

The data from the above procedures are quantitatively so large that it would be most imprudent to present tables displaying all of it in this paper. Only the minimum number of tables essential for this discussion are included. Other tabular data are available, however, to anyone who seriously wants them. Means and standard deviations of the teachers scores in 1973 on the CAI, the BTOI, the TSAI, the PRK, the PTIS, and the CVS were computed for the factors: school assignment, sex, marital status, grade level, teaching experience, and professional preparation. Table I contains the means and standard deviations for teachers scores on the six instruments by school and for the total group. To present similar tables for displaying the means and standard deviations of teachers scores on six instruments by the remaining factors would unduly extend this paper. Table II, however, contains a summary of the results of univariate analyses of teachers scores

on the six criterion measures for all six factors. From Table II, it can be observed that if we accept the five per cent level of confidence, significant differences were found among schools on the CAI, the BTOI, the TSAI, the PTIS, and the CVS. Significant differences between sexes in terms of the principals' rankings of teachers (PRK) were noted. There were no differences attributable to marital status for teacher performance on any of the criterion measures. Grade level assignment appeared to influence principals' ratings of teachers on the PTIS and the CVS. The amount of teaching experience influenced teacher performance upon the CAI, the TSAI, and the PRK. The amount of professional preparation influenced only teacher performance upon the TSAI.

For discussion purposes I have included Table III showing a comparison of the observed differences on the criterion measures for the six personal factors for 1970, 1972, and 1973. Shifts in differences attributable to the several factors occur on all except marital status, but marital status was only observed for 1973. We are not able at this time to account for all of these shifts, but we suspect that teachers have become acclimated to curriculum language both as it is used in communication within the curriculum systems in the school district and within the criterion measures, with the BTOI being the exception. It should be noted that data from the PTIS and CVS were analyzed in this form only during 1973; therefore, we do not have any comparable information for previous years. Apparently more significant differences are being observed on the criterion measures that are attributable to school assignment than any other factor. For 1973

differences were found for the school assignment factor on five of the six criterion measures.

Scores on the CAI, the BTOI, and the TSAI were produced by teachers rating themselves; whereas, scores on the PRK, the PTIS, and the CVS were produced by principals doing the rating. Interesting observations can be made from Table IV with respect to these two groups of data. Very low and insignificant correlations exist between the two groups. That is, when measures created by principal ratings of teachers are correlated with measures created by teachers rating themselves, the correlation coefficients are, for all practical purposes, zero. And this occurs despite the fact that the CAI, the TSAI, the PRK, the PTIS and the CVS are supposedly concerned with similar phenomena. The BTOI is an exception in that it appears to be independent of all other measures, and it was selected for use under that assumption.

We are unable to explain the low correlation between the ratings of teachers by principals and the teacher self-ratings. In order to alleviate this situation we will, in 1974, gather ratings from principals on items having to do with teacher behaviors that are the same as those upon which teachers rate themselves. We will use items from the TSAI for this purpose. Then we will be able to make an item by item analysis of likenesses and differences between the ways that teachers see themselves and the way their principals see them on the same operations. It is interesting that teachers consistently recognize a difference between the BTOI and the TSAI, and the CAI, but this was what was to be expected.

Certain data have been observed consistently since the beginning of the project. Table V displays the mean scores, the standard deviations, and the mean differences in scores for all schools and the total teacher group on the CAI, the BTOI, and the TSAI for the years 1970, 1972, and 1973. It can be noted from Table V that statistically significant mean growth in scores between the year intervals occurred occasionally on the CAI and the BTOI and frequently on the TSAI. More important is the fact that between 1970 and 1973 significant growth occurred in mean scores on all three measures for the total group.

We are pleased that significant growth has occurred between the installation of the curriculum engineering system in 1970 and 1973 on the CAI, the BTOI, and the TSAI. In our enthusiasm over this circumstance, we would like to be able to say that this growth is attributable to the installation of the curriculum engineering system. Our data, as yet, will not support that type of conclusion. We hope that continued study and additional data will ultimately lead us to more appropriate explanation.

This paper was presented at the 1974 annual meeting of the American Educational Research Association in Chicago.

APPENDIX

TABLE I. MEANS AND STANDARD DEVIATIONS OF TEACHERS' SCORES ON SIX INSTRUMENTS BY SCHOOL - 1973

TABLE II. SUMMARY OF RESULTS OF UNIVARIATE ANOVAS OF TEACHERS' SCORES ON SIX CRITERION MEASURES FOR SIX FACTORS - 1973

TABLE III. SUMMARY OF OBSERVED DIFFERENCES ON CRITERION MEASURES FOR PERSONAL FACTORS FOR 1970, 1972, AND 1973

TABLE IV. INTERCORRELATION MATRIX FOR TEACHERS' SCORES ON SIX INSTRUMENTS - 1973

TABLE V. MEANS, STANDARD DEVIATIONS, AND MEAN DIFFERENCES ON CAI, BTOI, AND TSAI FOR 1970, 1972, AND 1973.

TABLE I

MEANS AND STANDARD DEVIATIONS OF TEACHERS' SCORES

ON SIX INSTRUMENTS BY SCHOOL - 1973

School	N		CAI	BTOI	TSAI	PRK*	PTIS	CVS
1	31	M	192.32	470.68	138.87	51.16	25.07	23.30
		SD	15.79	37.52	11.64	9.07	1.71	2.81
2	9	M	194.11	485.56	143.22	48.89	21.78	18.56
		SD	18.16	27.65	13.86	9.57	3.93	3.68
3	22	M	185.18	475.86	144.68	50.00	24.14	23.73
		SD	14.48	42.74	16.19	9.94	1.78	1.50
4	6	M	198.83	520.83	154.50	49.33	24.33	20.08
		SD	13.12	35.32	16.08	7.92	2.16	5.29
5	14	M	200.79	500.86	155.21	50.00	25.00	22.79
		SD	16.20	41.33	11.04	9.87	1.57	2.16
6	16	M	179.31	475.63	136.38	50.69	18.28	20.47
		SD	18.47	32.13	18.47	10.44	2.35	2.76
7	9	M	185.67	473.89	144.89	50.11	24.22	24.46
		SD	10.60	23.34	8.31	9.84	2.11	2.21
TOTAL	107	M	189.97	480.77	143.58	50.31	23.46	22.41
		SD	16.74	38.24	14.99	9.38	3.13	3.18

* T-Scores

TABLE II

SUMMARY OF RESULTS OF UNIVARIATE ANOVAS OF TEACHERS' SCORES

ON SIX CRITERION MEASURES FOR SIX FACTORS - 1973

		F-ratios					
		CRITERION					
Factor		CAI	BTOI	TSAI	PRK	PTIS	CVS
School	(df=6,100)	3.31**	2.47*	3.54**	0.09	21.70**	7.36**
Sex	(df=1,105)	2.78	0.10	0.86	4.22*	0.67	1.78
Marital Status	(df=2,104)	1.11	0.01	0.21	0.91	0.17	0.31
Grade Level	(df=2,104)	0.56	1.73	2.99	0.19	15.06**	3.16*
Experience	(df=2,104)	4.50**	1.84	7.29**	3.12*	0.91	0.26
Preparation	(df=3,103)	1.59	0.08	2.76*	0.74	1.34	0.73

*$p < 0.05$

**$p < 0.01$

TABLE III

SUMMARY OF OBSERVED DIFFERENCES ON CRITERION MEASURES FOR PERSONAL FACTORS FOR 1970, 1972 AND 1973

Factor	Year	Criterion Measures					
		CAI	BTOI	TSAI	PRK	PTIS	CVS
School	1970	X	X				
	1972		X	X			
	1973	X	X	X		X	X
Sex	1970	X					
	1972						
	1973				X		
Marital Status	1973						
Grade Level	1970	X					
	1972						
	1973					X	X
Experience	1970		X				
	1972			X			
	1973	X		X	X		
Preparation	1970		X	X	X		
	1972				X		
	1973			X			

TABLE IV

INTERCORRELATION MATRIX FOR TEACHERS' SCORES

ON SIX INSTRUMENTS - 1973

	CAI	BTOI	TSAI	PRK	PTIS	CVS
CAI	1.00	.12	.55	.26	.27	.08
BTOI	.12	1.00	.27	.02	.05	-.16
TSAI	.55	.27	1.00	.20	.15	.04
PRK	.26	.02	.20	1.00	.37	.44
PTIS	.27	.05	.15	.37	1.00	.64
CVS	.08	-.16	.04	.44	.64	1.00

TABLE V

MEANS, STANDARD DEVIATIONS, AND MEAN DIFFERENCES ON CAI, BTOI, AND TSAI FOR 1970, 1972, AND 1973

	SCHOOL	1970			1972			1973					
		N_1	M_1	SD_1	N_2	M_2	SD_2	N_3	M_3	SD_3	M_2-M_1	M_3-M_2	M_3-M_1
CAI	01	30	191.60	19.17	33	194.24	18.38	32	192.03	15.61	2.64	-2.21	.43
	02	10	188.90	12.08	9	194.78	7.61	9	194.11	18.16	5.88	- .67	5.21
	03	24	184.25	15.41	23	191.78	17.98	22	185.18	14.48	7.53	-6.60	.93
	04	22	181.50	16.25	23	186.57	18.07	6	198.83	13.12	5.07	12.26	17.33*
	05	12	196.17	15.07	14	201.29	13.44	14	200.79	16.19	5.12	- .50	4.62
	06	14	177.21	11.05	18	186.39	17.30	18	179.94	18.88	9.18	-6.45	2.73
	07	12	176.00	20.09	12	190.83	17.89	10	187.10	10.97	14.83	-3.73	11.10
	TOTAL	124	185.48	17.24	132	191.89	17.30	111	189.91	16.74	6.41**	-1.98	4.43*
BTOI	01	30	455.80	45.14	33	470.64	45.26	32	472.44	38.23	14.84	1.80	16.64
	02	10	496.30	38.67	9	482.89	58.14	9	485.56	27.65	-13.41	2.67	-10.74
	03	24	467.08	40.84	23	476.30	36.41	22	475.86	42.74	9.22	-.44	8.78
	04	22	489.86	52.81	23	495.22	47.84	6	520.83	35.32	5.36	25.61	30.97
	05	12	478.58	46.95	14	488.50	38.13	14	500.86	41.33	9.92	12.36	22.28
	06	14	443.50	53.13	18	452.61	37.39	18	475.89	31.79	9.11	23.28	32.39*
	07	12	469.33	34.99	12	457.00	46.60	10	477.30	24.50	-12.13	20.30	7.97
	TOTAL	124	469.42	47.41	132	474.94	44.96	111	481.38	38.08	5.52	6.44	11.96*
TSAI	01	30	118.93	18.68	33	138.73	14.46	32	139.34	11.76	19.80**	.61	20.41**
	02	10	127.10	28.80	9	139.56	11.80	9	143.22	13.86	12.46	3.66	16.12
	03	24	127.38	17.54	23	151.61	14.92	22	144.68	16.19	24.23**	-6.93	17.30**
	04	22	115.18	15.62	23	142.91	17.65	6	154.50	16.08	27.73**	11.59	39.32**
	05	12	130.58	12.62	14	153.29	9.48	14	155.21	11.04	22.71**	1.92	24.63**
	06	14	124.71	13.43	18	137.78	12.67	18	135.89	17.68	13.07**	-1.89	11.18
	07	12	115.83	13.97	12	137.33	11.67	10	147.40	11.16	21.50**	10.07	31.57**
	TOTAL	124	122.04	17.97	132	143.05	15.06	111	143.70	15.09	21.01**	.65	21.66**

* $p < 0.05$
** $p < 0.01$